

**CASE, ASSEMBLY OF SHAPES, CASE-OPENING PROCESS AND PROCESS
AND MACHINE FOR MAKING SUCH A CASE**

The present invention relates to a packing case in two
5 sections, of the type comprising two shapes made of
cardboard or corrugated board sheet material, namely a
first shape forming a tray and a second shape forming an
upper section or lid for the case, imbricated with said
tray.

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It likewise relates to an assembly of shapes for
obtaining such a packing case and to processes and a
machine for making the case from the assembly of shapes.

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The invention also relates to a process for opening
such a case.

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The present invention finds a particularly important,
albeit non-exclusive application in the field of packings
for rigid (jars, boxes...) or semi-rigid products (bags...),
allowing products to be easily presented outside their
transport packing in an immediate, tidy and attractive
manner, especially on large-area shelving racks.

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Packing cases of the type described above (EPO 637
548) are already known, allowing rapid disconnection of
the upper section of the case from the bottom section.

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Such cases have the drawback, however, that they do
not allow the easy, rapid and complete removal of all the
products for presentation lined up on a rack.

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The object of the present invention is to provide a
case and an assembly of shapes which satisfy the practical
requirements better than those which have previously been
known, especially in that it enables the tray and the lid

of the packing to be fully removed by a few simple movements without touching the products, thereby allowing packing of the products to be completely dispensed with and thus enabling all the products contained in the 5 packing to be impeccably and immediately presented all at once on the racks in the shops.

The case, moreover, can be automatically assembled at a fast rate (more than twenty cases/min.), whilst at the 10 same time offering great solidity, the cases thus obtained by virtue of the invention being, moreover, easily stackable on a pallet.

To this end, the present invention especially proposes 15 a packing case in two sections of the type described above, characterized

in that the case comprises a first transverse side wall arranged to be grasped by a user, joined to the rest of the case by partially precut connecting lines allowing 20 said first wall to be manually torn off by the user from the rest of the case,

and in that one or the other side walls of the tray are fixed respectively to one or the other side walls of the lid solely by one or more partially precut portions 25 and/or one or more gluing points, enabling a separation between walls by manual parting achieved by the application of a force perpendicularly to the walls.

By partially precut portion (or also sometimes more 30 simply hereinafter referred to as precut portions) is meant a breakable portion which only holds together with the rest of the shape by a few attachment points or sections and which is consequently easily separable from the shape, by traction perpendicular to the plane of said 35 shape.

The partially precut portion(s) and/or the gluing point(s) are arranged to offer good resistance in the vertical direction, that is to say insofar as the forces are applied essentially in the plane of the walls.

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This resistance is, in particular, perfectly sufficient to allow the transport of products, even if the packing is grasped by the lid.

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If, on the other hand, the parting force applied between walls is absolutely perpendicular to the walls, these then are easily separated by manual means, with no delamination of the cardboard, for example with a force in the order of 5-10 Newtons, advantageously and, for example, following passing of a hard spot requiring an added force of a few Newtons on the part of the user, using, for example, his thumb as a drive bolt and/or lever arm in order to pass this hard spot.

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Moreover, it is worth noting that, as long as the first side wall of the case is not manually torn off by the user, the tray and the lid maintain their rigidity, thereby enabling neither parting nor gaping between tray and lid, which is advantageously also prevented, moreover, by the abovementioned hard spot(s).

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The imbrication between tray and lid can be internal or external, that is to say with the walls of the tray situated such that they are outside the lid or inside the lid.

Advantageously, the first transverse side wall is formed by the gluing together of two first side walls of the lid and tray respectively, one upon the other.

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The first side walls of the tray and of the lid, which are here mutually fixed by traditional solid gluing, for example by strips of glue of the "hot melt" type, thus likewise guarantee good rigidity of the case, with no 5 possibility of separation other than through delamination of the cardboard.

Gluing by use of a gluing point, such as partially precut portions which easily tear off from the rest of the 10 shape to which they belong, initially precludes, by contrast, delamination.

In order to be manually grasped, the first transverse side wall of the case comprises, or is, for example, 15 attached to grasping means.

According to the embodiment of the invention which is more particularly described here, these grasping means and the partially precut connecting lines of the first 20 transverse side wall are especially designed to allow said first side wall of the case to be torn off by a user, by, in particular, completely freeing the feet of the products.

25 The partially precut connecting lines of the first side wall with the rest of the packing advantageously coincide with the edges of the case, between walls, bottom and lid.

30 Likewise advantageously, only the partially precut connecting line of the first transverse side wall of the case with the bottom coincides with the corresponding edge and/or only the partially precut connecting lines with the adjacent side walls of the first side wall coincide with 35 the corresponding edges.

The user, who is able to grasp, for example, with his entire hand, the side wall to be torn off, applies a tear-off force greater than the parting force in order to separate the partially precut portions, for example a traction force of one to four kilograms.

Advantageously, it is all of a side face or substantially all of a side face (that is to say at least 70% of the face) which can be torn off, for example advantageously in one stroke by vertical or horizontal pulling, or else in two strokes by horizontal pulling from each side, the foot of the products being always fit to be disengaged from the side of said tear-off face.

15 Advantageously, the partially precut connecting lines (also sometimes more simply hereinafter referred to as precut connecting lines) are cut at the outset, or subsequently, in order to present a first hard spot, due to a greater length of the cut portions of cardboard, then
20 a more fragile section with longer precut sections, possibly consolidated by one or two additional intermediate hard spots, and terminating, for example, in a section which is easier to tear off.

25 The fractioning of the tear-off forces thus allows the
non-separation of the first side wall to be better
guaranteed in the event of lateral shocks and/or
unforeseen forces applied to the case.

Such measures, following tearing-off of the first wall of the packing and fractioning of the gluing points or of the partially pre-cut portions, for example likewise joined to the rest of the shape which bears them by pre-cut lines having one or more hard spots, also allow the tray to be withdrawn without the products, whilst the user holds the lid in place over the products, and then allow the lid to

be removed from the products, for example by raising it slightly and/or sliding it horizontally along the products.

5 In advantageous embodiments, one and/or other of the following measures are likewise adopted:

- the partially precut, upper connecting line of the first side wall of the case with the lid is situated on the lid or else coincides with the edge of the upper face 10 of the lid;

- the partially precut, upper connecting line of the first side wall of the case with the lid is situated on said first wall, thereby leaving an upper fascia attached to the lid following tearing-off.

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Such a measure will enable the upper part of the products to be blocked as the tray is removed from beneath the feet of the products, which might in certain cases have lost balance and fallen backwards;

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The fascia which is left can likewise have substantial dimensions.

- the means for grasping the first wall of the case comprises a handle, for example constituted by a recess 25 centered on the upper connecting line of said wall;

- the partially precut portion(s) and/or gluing points between tray and lid belong to the second transverse side wall of the case, opposite to the tear-off, first transverse side wall;

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- the lid is imbricated in the tray;

- the case comprises at least two partially precut portions or gluing points respectively situated at some place on the longitudinal side walls of the case;

- the partially precut portion(s) belong to the tray;

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- the partially precut portion(s) are precut according to an open line, or according to a closed line;

- the first shape comprises a series of three leaves, namely a central leaf forming the bottom of the tray laterally joined by first fold lines to two side leaves forming, at least in part, the longitudinal side walls of 5 said tray, said series comprising at least one transverse flap situated on one side of said leaves to which it is joined by at least one partially precut, second fold line perpendicular to the first fold lines, said transverse flap forming, at least in part, the first transverse side 10 wall of the tray;

- each side leaf comprises two partially precut portions;

- the second shape comprises three panels, namely a rectangular central panel forming the upper face of the 15 lid of the case laterally joined by third fold lines to two side panels forming, at least in part, the side walls of the case, joined together with the first shape respectively by said lateral, partially precut portion(s), or said gluing points, on the one hand, and by gluing 20 lines, on the other hand;

- the second shape comprises two sets of side flaps situated at some place on said panels, to which they are joined by fourth fold lines situated facing said second fold lines of the first shape, the fourth fold lines 25 between flap and one of the side panels being partially precut;

- the second shape comprises at least four panels respectively mutually joined by fourth fold lines parallel to the second fold lines of the first shape, and an end 30 gluing tongue, the four panels comprising a set of flaps situated on the side opposite to the first shape;

- each leaf of the first shape comprises a transverse flap, namely a central flap joined to the central leaf and forming a partially precut bottom portion, and two side 35 flaps joined to the side leaves and glued on said central flap.

The invention likewise relates to an assembly of shapes for making a case such as described above.

The invention equally relates to an assembly of 5 shapes, characterized in that it comprises two shapes, each respectively formed from a central leaf or panel and from side leaves or panels, namely a first shape intended to form a tray and a second shape intended to form the lid of the case,

10 the first shape comprising a second transverse flap or at least one side leaf joined to the central leaf and arranged to be joined together to an adjacent side panel by means of at least one partially precut portion belonging to one of the shapes and glued to the other 15 shape,

and a first transverse flap joined on the other side to the central leaf by a partially precut connecting line,

and in that a side panel of the second shape is fit to be glued to the first transverse flap and is joined to the 20 central panel by a partially precut connecting line.

Advantageously, the side leaves of the first shape each comprise a flap, respectively joined to the corresponding leaf by a partially precut fold line on the 25 side of the first transverse flap.

Advantageously, the side panel joined to the bottom by a partially precut connecting line comprises two flaps joined to said side panel by partially precut fold lines.

30 In an advantageous embodiment, the first shape comprises at least one partially precut flap and the second shape at least four panels, one of which joined to its two adjacent panels by partially precut fold lines and 35 provided with a flap joined directly or by means of a fascia-forming panel portion to said panel, and intended

to form the first vertical bottom wall of the case, by a partially precut fold line.

Advantageously, the second shape comprises four 5 panels, one of which joined to its two adjacent panels by partially precut fold lines.

The invention likewise relates to a process for opening a case and for shelving the product contained 10 therein, characterized in that a transverse wall of the case is manually torn off, the walls and the lid of the case are manually separated from the bottom, the bottom is pulled horizontally in order to free the base of the products which are on top of it, and then the lid is 15 removed in order to free completely the products contained therein.

More particularly, the invention likewise relates to a process for opening a case of polygonal cross section 20 formed out of two shapes made of cardboard or corrugated board sheet material, namely a first shape fit to form a tray and a second shape fit to form the lid of the case, said case being filled with rigid or semi-rigid products, characterized in that, the case comprising a first 25 transverse side wall joined to the rest of the packing by partially precut connecting lines allowing tearing-off:

- the first transverse side wall is torn off manually, for example in one stroke,

- the walls of the rest of the tray are manually 30 separated from the walls of the rest of the lid, one or more of said walls being solely fixed together by means of partially precut wall portions or by easily separable gluing points,

- the tray is pulled horizontally in order to free the 35 tray from the products which are on top of it,

- then the lid is removed in order to free completely the products contained therein.

Advantageously, the lid comprising a fascia following 5 tearing-off of the first transverse side wall, the lid is pivoted upwards in order to slide the fascia away from the products prior to horizontal pulling of the lid.

The present invention likewise proposes a packing case 10 in two sections, comprising two shapes made of cardboard or corrugated board sheet material, namely a first shape forming a tray and a second shape forming an upper section of the case imbricated with said tray, the first shape and second shape being joined by means allowing their 15 separation, constituted by at least one portion of partially precut leaf in one of said shapes, characterized in that

the case comprises a first transverse side wall formed by two leaves belonging respectively to each shape 20 arranged to be grasped by a user and joined to the rest of the case by partially precut connecting lines allowing said first wall to be manually torn off by the user from the rest of the case.

25 Advantageously, each shape comprises a series of four primary leaves terminated by a fixing tongue, said primary leaves and said tongue being mutually joined by mutually parallel first fold lines, directly or by means of secondary leaves, and an assembly of first side flaps, 30 disposed on one side of said series of primary leaves and joined to the latter by second fold lines perpendicular to said first fold lines and intended to form, at least partially, the bottom of the tray, on the one hand, and the top of the upper section of the case, on the other hand. 35

Advantageously, the partially precut portion(s) are replaced by one or more gluing points enabling a separation between leaves or walls by manual parting achieved by the application of a force perpendicularly to 5 the walls.

It should be borne in mind that by precut or partially precut portion is meant a breakable portion which only holds together with the rest of the shape by a few 10 attachment points or sections and which is consequently easily separable from the shape, by traction perpendicular to the plane of said cut.

Advantageously, the fixing tongue of the second 15 element extends along one section only of the side edge of the adjacent leaf to which it is joined, above the fixing tongue of the first element.

In another advantageous embodiment, the primary leaves 20 are mutually separated by secondary leaves to form an eight-sided case, with cut corners.

The present invention also proposes an assembly of shapes for a packing case, comprising two elements, 25 manually separable one from the other and arranged to be inserted one inside the other, which are respectively formed out of shapes made of cardboard or corrugated board sheet material, namely a first shape fit to form a display tray and a second shape fit to form the upper section of 30 the case, each element comprising a series of four primary leaves terminated by a fixing tongue, said primary leaves and said tongue being mutually joined by mutually parallel first fold lines, directly or by means of secondary leaves, and an assembly of first side flaps, disposed on 35 one side of said series of primary leaves and joined to the latter by second fold lines perpendicular to said

first fold lines and intended to form, at least partially, the bottom of the tray-forming first element, on the one hand, and the top of the second element, on the other hand, the two elements being arranged to be mutually 5 joined by at least one precut leaf portion in one of said primary leaves of the first element, referred to as the outer leaf, said portion being fixed to the corresponding primary leaf facing the second element, referred to as the inner leaf, characterized

10 in that a transverse leaf of the first shape and a transverse leaf of the second shape are joined to the flap and to the corresponding adjacent leaves by precut connecting lines.

15 In advantageous embodiments, various measures described above with reference to the case according to the invention are further adopted.

The invention likewise proposes an assembly of shapes, 20 characterized in that it comprises two shapes each respectively formed from three leaves, namely a first shape intended to form a tray and a second shape intended to form an upper section, said shapes being mutually joined together solely by means of two precut portions 25 belonging to one of the shapes and glued to the other shape.

Advantageously, the two shapes are folded flat one upon the other.

30 It also proposes a case obtained with such an assembly of shapes, through tunnelling of said assembly glued by means of said precut portions belonging to the end leaves.

35 The invention likewise proposes a process for the realization of a packing case of polygonal cross section

out of two shapes made of corrugated board sheet material, namely a first shape fit to form a display tray and a second shape fit to form the upper section of the case of the type previously described.

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It also proposes and, more precisely, a process for the realization of such a packing case out of two shapes, characterized in that,

one of the shapes comprising at least two precut
10 portions in said shape,

said portions are flat-coated with glue,

one of said portions is applied flat onto the other shape,

the assembly of shapes which is thus joined together
15 is wound around a mass of predetermined dimensions,

then the other previously glue-coated portion is applied to the other shape, following winding and folding-down around said mass, in such a way as to form said

packing case, the display tray of which can be manually
20 separated from the upper section of the case by simple
traction of one of the shapes toward the outside of the

In an advantageous embodiment, the mass of determined dimension is a mandrel.

Likewise advantageously, the used process relates to two shapes such that the first shape comprises a series of three leaves, namely a central leaf fit to form the bottom of the tray laterally joined by first fold lines to two side leaves fit to form, at least in part, two longitudinal side walls of said tray, said series comprising at least one set of transverse flaps, situated on one side of said leaves, to which the set is joined by second fold lines perpendicular to the first fold lines, and intended to form, at least in part, a transverse side

wall of said tray, and the second shape comprises at least one panel.

The invention likewise proposes a machine for the realization of a packing case of polygonal cross section out of two shapes made of corrugated board sheet material, namely a first shape fit to provide a display tray and a second shape fit to form the upper section of the case,

characterized in that, one of the shapes comprising at least two precut portions in said shape, respectively situated at some place on said shape relative to a longitudinal axis, said machine comprises

- means for coating said determined portions with
glue,

15 - means for positioning the shapes one upon the other to allow a first of the precut portions to be glued onto the other shape, the fold lines of the one of the shapes being placed relative to the fold lines of the other shape to allow winding around a mass of determined dimensions,

20 - application means for fixing said first precut portion onto the other shape by gluing,

- and means for forming the box by winding and folding-down of the leaves, panels and flaps of the shapes thus joined together around said mass of determined dimensions, for fixing solely by gluing.

Advantageously, the machine comprises two feed magazines disposed at some place on the packing machine for the shapes.

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Advantageously, the mass of predetermined dimensions is a mandrel, for example an eight-sided mandrel.

The invention likewise proposes a machine for
35 implementing the above-described process out of the
assembly of shapes likewise previously described.

It also proposes a process for opening a case of polygonal cross section formed out of two shapes made of corrugated board sheet material, namely a first shape fit to form a display tray and a second shape fit to form the upper section of the case, said case being filled with rigid or semi-rigid products,

characterized in that:

the shapes being mutually joined together solely by one or more precut portions,

- the tray is manually separated from the upper section of the case by tearing-off at the level of the precut sections.

- the tray is pulled horizontally in order to free the tray and the products which are on top of it,
- then the upper section is likewise pulled horizontally in order to free completely the products

In other words, the tray is pulled from under the very feet of the products which are going to be able to remain alone on the rack.

Advantageously, the tractions are effected on the same side.

25 It also proposes a process for opening a case according to the embodiments described above, in which the upper section and the tray are removed by pulling them successively and horizontally from over and under the
30 products contained in the case.

The invention likewise proposes a packing case in two sections, comprising two shapes made of cardboard or corrugated board sheet material, namely a first shape forming a display tray and a second shape forming an upper

section of the case imbricated inside said tray, characterized

in that the tray comprises two transverse vertical walls, namely a first transverse wall which can be 5 manually separated, by simple traction in the outward direction, from the longitudinal vertical walls of said tray and/or from the vertical wall of said upper section of the opposite-facing case, said first transverse wall being able to be completely detached from the bottom of 10 the tray or reflattened in the extension of the bottom of the tray without creating an excess thickness of cardboard, and a second transverse wall fit to be grasped by an operator,

and in that the longitudinal vertical walls of the 15 tray are joined together with the vertical walls of the opposite-facing upper section solely by one or more lateral precut portions, which can be manually separated by simple traction, and/or one or more gluing points, which can be manually unstuck by simple traction.

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In advantageous embodiments, one and/or other of the following measures can likewise or additionally be adopted:

- the second transverse wall of the tray is provided 25 with a handle or with a grip recess;
- the upper section comprises a transverse extraction face provided with a handle or with a grip recess;
- the lateral precut portions belong to the first shape;
- the lateral precut portions are cut according to an open line.

Advantageously, they are cut with one side fully disengaged in the direction of the first transverse wall.

Thus, when the tray is to be slid away by horizontal traction from beneath the feet of the products, the precut portions which remain glued on the upper section will not meet any obstacle, thus facilitating or allowing 5 horizontal extraction.

- the first shape comprises a series of three leaves, namely a central leaf fit to form the bottom of the tray laterally joined by first fold lines to two side leaves 10 forming, at least in part, the longitudinal vertical walls of said tray, said series comprising at least one transverse bottom flap situated on one side of the leaves, to which it is joined by at least one second fold line perpendicular to the first fold lines, said transverse 15 bottom flap forming, at least in part, the first transverse bottom wall of said tray,

- the second shape comprises three panels, namely a central panel forming the upper face of the upper section of the case, laterally joined by third fold lines to side 20 panels forming, at least in part, the side walls of the case so as to be joined together with the side leaves of the first shape by said lateral precut portions, or the gluing points.

25 Advantageously, the panels comprise two sets of side flaps situated at some place on said panels, to which they are joined by fourth fold lines situated facing said second fold lines of the first shape.

30 Advantageously, the fourth fold lines are staggered relative to the second fold lines by a thickness of cardboard in the inward direction in order better to allow the upper section of the case to take up position inside the tray;

35 - the lateral precut portions are cut according to a closed line;

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- the lateral precut portions belong to the side panels of the second shape.

- there are two lateral precut portions, which are symmetrical relative to the longitudinal axis of the packing;

- there are four lateral precut portions, which are symmetrical in pairs relative to the longitudinal axis of the packing;

- the second shape comprises at least four panels, 10 respectively mutually joined by fourth fold lines parallel to the second fold lines of the first shape, and an end gluing tongue, the four panels comprising a set of flaps situated on the side opposite to the first shape;

- the lateral precut portions run obliquely from the 15 junctions between first and second fold lines toward the outside of the first shape, for example at an angle of between 5 and 30° relative to the corresponding first fold line;

- the upper section comprises a vertical bottom wall 20 separated or separable from the longitudinal walls by precut vertical fold lines, the central leaf of the tray comprising a central transverse flap joined to said bottom by a precut fold line and glued to said vertical bottom wall.

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Such a measure allows the complete and simultaneous tearing-off of the bottom walls of the tray and of the upper section, completely freeing an external face of the products contained in the case, thereby enabling the 30 removal of the tray and of the upper section by horizontal traction.

- each leaf of the first shape comprises a transverse bottom flap, namely a central flap joined to the central leaf and provided with two precut bottom portions and two 35 side flaps joined to the side leaves and glued on said precut bottom portions.

Such a measure allows the central bottom flap to be ref flattened without exhibiting excess thickness relative to the bottom, the pre cut portions remaining glued to 5 those side flaps which are slid away on their side in the extension of the vertical longitudinal walls of the tray.

Advantageously, the upper section comprises a transverse vertical bottom wall formed from three flaps, 10 two of which are concertina flaps, joined to the third.

In other words, two side flaps, belonging respectively to the side panels of the second shape, each comprise a 45° fold line running from the fourth fold lines in the 15 outward direction from the junction between third and fourth fold lines;

Such a measure will enable the flaps to be formed automatically into a tunnel shape, which flaps will be 20 able to glide horizontally over the load in the case, thus allowing the upper section of the case to be extracted horizontally and not solely by the top, as in the prior art.

25 The invention likewise proposes an assembly of shapes for obtaining a case of the type described above.

The invention likewise proposes an assembly of shapes for making a case, characterized in that it comprises two 30 shapes, each respectively formed from a central leaf or panel and from two side leaves or panels, namely a first shape intended to form a tray and a second shape intended to form an upper section of the case, said shapes being fit to be mutually joined together by their respective 35 side leaves and panels solely by means of at least two

lateral precut portions belonging to one of the shapes and fit to be glued to the other shape.

Advantageously, the central leaf of the first shape 5 comprises a central flap in the extension of said bottom provided with two precut bottom portions and the side leaves of the first shape each comprise a side flap fit to be glued respectively on said precut bottom portions.

10 Likewise advantageously, the central panel of the second shape comprises a central flap in the extension of said panel provided with two precut lid portions and the side panels of the second shape each comprise a side flap fit to be glued respectively on said precut lid portions.

15 In one advantageous embodiment, the first shape and the second shape each comprise a set of one or more flaps, said sets being respectively joined to the corresponding leaves and panels by precut fold lines.

20 In another advantageous embodiment, the first shape comprises three precut flaps and the second shape at least four panels, one of which provided with a flap joined to said panel, intended to form the bottom of the case, by a 25 precut fold line.

The present invention will be better understood from reading the following description of embodiments presented by way of non-limiting examples.

30 The description refers to the accompanying drawings, in which:

- Figure 1 is a perspective view of a case according to a first embodiment of the invention, with fascia.

- Figure 2 is a perspective view of the lid of the case of Figure 1, following tearing-off of the first transverse side wall and removal of the tray.

5 - Figure 3 is a plan view of the assembly of shapes, separated, allowing the realization of a case of the type shown in Figure 1.

10 - Figure 4 is a plan view of an assembly of shapes according to another embodiment of the invention, showing three variants of a partially precut upper connecting line.

- Figures 5 and 6 are diagrammatic side views showing the opening of the case of Figure 1, with fascia.

- Figures 7 to 12 show an embodiment of the process for opening a case according to the invention.

15 - Figure 13 is a plan view of an assembly of blanks according to the embodiment of the invention corresponding to Figures 7 to 12.

20 - Figure 14 is a perspective view of an assembly of shapes, according to another embodiment of the invention having four leaves, prior to assembly.

- Figure 15 is a perspective view of the box, lid and open bottom obtained with the shapes of Figure 14.

- Figure 16 is a perspective view of Figure 15 according to the invention, following gluing.

25 - Figure 17 shows the case of Figure 16 at the various stages of its opening.

- Figure 18 shows a packing case according to another embodiment of the invention, having eight sides.

30 - Figure 19 is a plan view of the two shapes allowing the realization of the case of Figure 18.

- Figure 20 shows in perspective view another embodiment of an eight-sided case according to the invention.

35 - Figures 21 to 23 present the assembly of shapes, corresponding to the case Figure 20 assembly, before and after flat-joining.

- Figure 24 shows in perspective view another embodiment of a display case according to the invention, having a small tear-off face.

5 - Figures 25 and 26 show in perspective view another embodiment of a display case according to the invention at the various stages of its opening.

- Figures 27 and 28 show respectively the first and second shapes corresponding to the case of Figures 25 and 26.

10 - Figures 29 and 30 show respectively a variant of the second and first shapes, corresponding to another case according to the invention.

15 - Figures 31 and 32 show in perspective view the embodiment of the display case according to the invention, corresponding to the shapes of Figures 29 and 30, at the various stages of its opening.

- Figure 33 is a block diagram in perspective view of the concretization, filling and shelving of a packing according to another embodiment of the invention.

20 - Figures 34 and 35 show another block diagram in perspective view of the concretization, filling and shelving of a packing according to another embodiment of the invention.

25 - Figure 36 is a diagrammatic representation, in perspective view, of a first embodiment of a machine according to the invention.

- Figure 37 is an exploded representation, in perspective view, of a first part of the machine of Figure 36.

30 - Figure 38 is a side view of a mechanical working diagram showing the various stages of an embodiment of the process according to the invention.

35 - Figures 39 and 40 are perspective views of the second part of the machine of Figure 36, showing the winding around a mandrel, then the folding-down over the bottom of the mandrel prior to ejection of the case.

Figure 1 shows a parallelepipedal case 1 in two sections, namely a rectangular tray 2 and a lid 3 formed out of shapes made of corrugated board sheet material, for example of 3 mm thick, double-faced corrugated board.

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The case comprises a first transverse side wall 4, which can be torn off and is rectangular or substantially rectangular, formed by a first rectangular wall 5 of the tray and an opposite-facing first rectangular wall 6 of the lid being glued one upon the other, for example using 10 four lines of "hot melt" glue.

The first wall 6 of the lid is joined with the upper section of the case by a precut line 7, which traverses 15 the wall at some place, for example at 4/5th of the height of the wall or close to the top of the lid, and comprises a recess 7', situated in the middle of the line, for example formed by a half-moon, allowing a user to slide in two fingers in order to initiate a tearing-off and 20 allowing him next to grasp the wall with his entire hand.

The first wall 5 of the tray is joined to the adjacent lateral sides and to the bottom of the tray either by three partially precut fold lines 8, 9, which coincide 25 with the edges of the parallelepiped formed by the case, or not a single precut fold line 9' connecting with the bottom, as represented on the first shape of Figure 3, in which case the other edges 8' of the first wall are free.

30 The partially precut lines (also sometimes simply referred to in the body of the text as precut lines) are obtained by perforating the cardboard in a dotted pattern using perforation-generating punching tools. The dots are therefore defined by an alternation of perforated lines 35 referred to as cutters and non-perforated lines referred to as points of attachment.

This distance separating two points of attachment, or, in other words, the length of cut, being designated as D1, and the distance separating two cutting rules, or, in other words, the point of attachment length, being 5 designated as D2, a perforating profile is therefore defined by a two-digit series corresponding to D1 and D2.

As a function of the nature and gram weight of the papers, as well as of the thickness of the corrugated 10 board, the values of D1 and D2 are varied until the best possible compromise is found to allow easy tearing-off, whilst maintaining sufficient solidity of the packing.

Advantageously, D1 and D2 will likewise be varied on 15 the same precut line to create more fragile spots or hard spots, as described above.

The case 1 further comprises three other rectangular side walls 10, 11 and 12, namely two longitudinal side 20 walls 10 and 11 and a second transverse side wall 12.

More precisely, and likewise with reference to Figures 2 and 3, the case is formed from two shapes, namely a first shape 13 comprising a rectangular central leaf 14 and two side leaves 15, joined by first fold lines to the central leaf 14, each provided with two rectangular, or substantially rectangular, partially precut portions 16 and 17, one 16 of which is situated at one end of the tray and is free on three sides and the other 17 of which is 30 situated toward the other end and is free on two sides.

The connecting lines 18 between partially precut portions (once again sometimes more simply referred to in the body of the text as precut portions) and the rest of 35 the shape are, for example, provided having a value D1 greater than D2.

As has been seen, the tray comprises a first set of flaps 19, being able to comprise two first side flaps (here absent from Figure 3) and a first side flap 5.

5 The tray likewise comprises a second set 20 of flaps joined to the leaves and/or mutually joined, in a manner known per se, by second normal fold lines.

10 The first flap(s) are joined to the corresponding leaves and/or to the first primary flap by the second precut fold lines 8, 9 or 9', said flaps being fit to form, in part, the first tear-off wall of the case.

15 The second shape 21 (cf. Figure 3) comprises, for its part, four rectangular panels 22 and a gluing tongue 22', mutually joined, in pairs, by parallel third fold lines 23, 23', and a set of rectangular flaps 24, 25, which are identical in pairs and are fit to form the top of the lid and one pair 24 of which is designed to be joined to the 20 adjacent panel 22 by the partially precut line 7, via a fascia 26.

Said panel adjacent to the flap is itself joined to its adjacent panels by precut fold lines 23', superposed 25 with lines 8' or 8 of the tray.

30 The front face formed by the panel 22 glued in its bottom section onto the central flap 5 of the tray, for example by gluing lines 27 (cf. Figure 1), can be completely torn off according to the arrow 28, given the connecting lines or precut edges.

35 By virtue of the grip opening 7' provided at the level of the connecting line between lid and central panel, it is actually possible, when the case is closed and glued,

to grasp and then tear off the whole of the front face of the case in one piece.

The tray, which can be grasped, for example, on the other side by a handle (not represented), will henceforth be able to be removed by horizontal pulling, followed by the upper section or lid, which can be grasped by its lower section situated on the other side of the first tear-off set 19.

10

Figure 4 shows an assembly 30 of shapes, comprising a first shape 31 fit to form a rectangular tray, comprising a rectangular central leaf 32 joined by first fold lines 33 to rectangular side leaves 34, at some place, and two sets 35 and 36 of identical small, rectangular flaps, joined to said leaves by second fold lines 37 and 38 perpendicular to the first fold lines, namely a set 35 having normal fold lines 37 and a set 36 having partially precut fold lines 38, according to the invention, which sets of flaps are fit to form, in part, the tear-off panel.

The assembly of shapes likewise comprises a second shape 40, for the lid, formed from three rectangular panels 41, 42 and 43, namely a panel 41 intended to form the top of the lid and two panels 42 and 43 intended to form the transverse sides of the lid.

The panel 42, intended to form the transverse side of
30 the bottom of the case, is joined to the central panel by
a normal fold line 42'.

The panel 42 advantageously comprises a grip handle 45 formed by a recess, and a partially precut portion 46, according to the invention, which is central, rectangular and open onto the edge of the panel, glued or fit to be

glued onto the primary flap of the set 35 of flaps of the first shape.

5 The panel 43 is, for its part, intended to form the first tear-off wall of the case, with the set of flaps 36.

10 It comprises an upper connecting line 44, 44' or 44'' with the top of the lid, which connecting line is partially precut and provided with a central grip opening 45.

15 The line 44 is situated in the panel 43 which it traverses at some place, for example with a gentle, upwardly directed radius of curvature, which allows a fascia to be left in place after tearing-off.

20 The line 44', another embodiment of the upper connecting line, is, for its part, merged with the fold line or edge of the case, and the line 44'', a third embodiment, runs from each side of an angle of the case and is next sited in the top of the lid, which is therefore partially torn off at the same time as the panel and is, for example, in the form of an isosceles trapezium.

25

The central panel 41 and the side panels 42 and 43 each comprise two sets of rectangular side flaps 49, 50 and 51, joined by fold lines to the corresponding panel.

30 The set of flaps 49 is joined to the panel 43, up to the junction with the upper connecting line 44, 44' or 44'', by partially precut fold lines 52 in order to allow tearing-off.

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In Figures 5 and 6, the three main stages in the opening of the case 1 according to the embodiment of Figures 1 and 2, having a fascia 26, are represented.

5 First of all, the panel or first transverse side wall 4 is torn off (arrow 28).

Then the tray 2 is pulled from beneath the feet of the products 54 (arrow 53), which the fascia 26 prevents from 10 toppling over by holding onto the upper part 55 of said products.

The fascia 26 is then slid away by pivoting of the lid 3 by tilting action, prior to this being extracted in the 15 horizontal direction (arrow 56).

Figures 7 to 13 show a case 60 and a corresponding assembly of shapes 61.

20 The assembly 61 comprises a first shape 62 provided with a rectangular primary leaf 63, joined to two side leaves 64 which are symmetrical relative to the longitudinal axis 65 of said shape, comprising, for example, two sections of different heights.

25 Each side leaf 64 is provided with a partially precut portion 66, for example in a diamond shape and disposed in the open margin of the periphery of the side leaf 64, for example at the level of the junction between the two 30 sections of different heights, substantially at the center of the corresponding leaf.

Each leaf further comprises at some place a rectangular side flap, namely on one side the flaps 67, 68 35 and on the other side the flaps 69, 70. The flaps 69 and

70 are joined to the adjacent leaves by a partially precut fold line 71 and the flaps 67 and 68 by a normal line 72.

5 The second shape 73 comprises, for its part, three panels, namely a rectangular central panel 74 and two rectangular side panels 75, which are symmetrical relative to the longitudinal axis 76 of the shape.

10 Each panel comprises at some place a rectangular flap.

More precisely, the central panel 74 and the side panels comprise respectively on one side rectangular flaps 76 and 77 and on the other side flaps 78 and 79.

15 The flaps 78 and 79 are joined to the corresponding panel by a partially precut fold line 80.

20 As the case is opened, it is therefore possible (cf. Figure 8) to tear off the wall 81 in one piece, said wall being formed by the flaps 78, 79 of the lid and the flaps 69, 70 of the tray, glued together, which become detached by reason of the precut fold lines, thereby enabling the lateral withdrawal of the products 82 by pulling horizontally on the upper section or lid as indicated by 25 the arrow 83 in Figure 11, following the detachment of partially precut portions 66 through lateral parting (arrow 84, Figure 9).

30 The process for opening a case according to the advantageous embodiment of the invention will now be described below, with reference to Figures 7 to 12.

35 The operator tears off in one stroke the whole of the front face 81 of the case, this being joined to the rest of the packing, both at the level of the tray and at the level of the upper section, solely by precut fold lines.

The side leaves of the tray are then separated using the thumbs (Figure 9), the precut portions 66 remaining glued to the side panels 75.

5 The tray is next pulled from beneath the product, using the handle 85.

Finally, the upper section is likewise pulled horizontally (arrow 83, Figure 11), for example with the 10 aid of a carved recess in the rear face (not represented).

Figures 14, 15, 16 and 17 show an assembly 101, or 15 various elements of an assembly, of shapes made of double-faced corrugated board sheets, for example of 2 mm thickness, for forming a case 106.

For these figures, the same reference numbers will be used to designate the case elements and/or identical shapes or shapes occupying the same position.

20 This assembly 101 comprises a first shape 102 fit to form the tray and a second shape 103 fit to form the lid of the case.

25 The second shape is superposed, flat, on the first shape, and is fit to form an inner band for the case once the latter is formed.

The first shape 102 comprises a series of four leaves, 30 namely two so-called side leaves 104 and 104' disposed in alternation with two so-called facial leaves 104'' and 104''', the leaves being mutually joined by mutually parallel first fold lines 105 and 105' and represented respectively by dot-dash lines and broken lines in Figure 35 14, the series of leaves being fit to form the outer walls of the four-sided tray 106 (cf. Figure 16).

More precisely, the leaves 104 and 104' are shaped as a rectangular trapezium.

They are symmetrical relative to the rectangular 5 facial leaf 104'', which forms the rear face of the tray and which is greater in height than the rectangular facial leaf 104''' which forms the front face of the tray.

The fold line 105' between the leaves 104 and 104''' 10 is precut, just like the fold line 105' between the gluing tongue 104a and the adjacent leaf 104', which will allow the first wall to be torn off.

In another embodiment, it is the fold lines 105 15 between the leaf 104'' and the leaves 104 and 104' which are precut (or, in other words, partially precut), that is to say having cut portions contiguous with points of attachment, in which case it is the rear face which is designed to be able to be torn off.

20

The leaves 104 and 104' comprise, for their part, an upper peripheral edge 107 and 107', which is downward-slanting and is directed in the opposite direction to the leaf 104''.

25

The tongue 104a is rectangular and extends over the full height of the small side.

The series of leaves 104, 104', 104'', 104''' is 30 provided, moreover, on its lower side, with a first series 108 of rectangular flaps, via second fold lines 109 and 109'.

The flaps 108 are intended to form the bottom 108' 35 (see Figure 15) of the tray, in a known manner, two of

said flaps coming into contact, for example, by their outer edge, to form a hermetic bottom.

5 The fold line 109' between the leaf 104''' and the corresponding flap is precut.

10 The second shape 103 comprises four rectangular leaves, which will hereinafter be referred to as panels in order better to differentiate them from the leaves of the first shape.

15 The panels in question are a central first rectangular panel 110 and three secondary rectangular panels 111, 112 and 113, mutually joined by third fold lines 114 and 114', namely two panels 112 and 113, joined at some place to the central panel 110, and an end panel 111, joined to the other end of the panel 112 by a precut fold line 114'.

20 The shape 3 comprises a second series 115 of flaps, identical to the first series 108 of flaps, joined to the adjacent panels by fifth fold lines 116 and 116', perpendicular to the first lines 114, and intended to form the lid 115' of the box, the fold line 116' connecting the panel 111 with its flap being precut.

25

An end tongue 113a is further provided, joined to the end panel 113 on one part only of the height of the latter, which part is situated adjoining the fold lines 116, by a precut fold line 114'.

30

The tongue 113a is placed on the same side as the tongue 104a and its length is, for example, equal to the height of the panel 113, minus a length equal to or a little greater than the length of the tongue 104a.

35

The tongues 104a and 113a are also provided and arranged to close on the walls facing the formed shapes without overlapping each other, even though they are on the same side (cf. Figure 15), and so as to be able to be 5 torn off according to the invention.

Advantageously, the fold lines 114, 114' and 105, 105' of the two shapes are parallel and staggered, arranged so as to accommodate the excess thicknesses of cardboard when 10 folded.

The tray comprises, moreover, two precut, for example oval, portions, made up of closed lines 120 and 121, entirely situated at a distance from the edge 107, 107' of 15 the leaves 104, 104'.

With reference to Figures 16 and 17, the tray therefore comprises a first set of flaps 108 forming the bottom, joined to the corresponding leaves by fold lines 20 109 and 109', of which the latter is precut.

Similarly, the second shape 103 comprises four rectangular flaps 119 joined to the corresponding panels by fold lines 116, one of which 116' is precut.

25 A grip opening 122 is provided at the level of the fold line with the central panel, thereby allowing, when the case is closed and glued, the wall to be seized and the whole of the front face of the case to be torn off in 30 one piece according to the arrow 123.

The tray, for example which can be seized on the other side by the handle 124 (recess), will henceforth be able to be removed as previously described, followed by the 35 upper section, which can be grasped by the lower section

of flap situated on the other side of the tear-off first set.

The horizontal glue lines are represented in Figures 5 16 and 17, the leaf 104''' being glued on the vertical panel 111.

The precut portions 120 are, for their part, provided toward the center of the tray, thereby avoiding gapes in 10 the absence of side flaps which usually hold the tray in the correct position.

The portions 120 can likewise advantageously be made up of open lines.

15 In Figure 18, an eight-sided case 130 according to one embodiment of the invention has been represented, comprising a first element 131 forming a tray and a second element 132 forming the upper section of the case, the 20 flaps 133 of which are open to allow filling of the formed case.

According to the embodiment of the invention which is described here, this case is rigid and non-pliable once 25 the tongues have been glued on the opposite-facing walls and comprises precut fold lines 134, 135, 136, 137 allowing the face 38 with cut corners to be torn off.

A recess 139 is provided, for example, at some place 30 in the panels of the second element 132, at the level of and a little above the upper section of the tray, thereby facilitating the extraction of said second element after this has been disconnected from the first element.

35 In Figure 19, an embodiment of the first shape 141 and second shape 142 of an assembly according to the invention

has been represented, allowing an eight-sided case to be obtained of the type appearing in Figure 18.

The first shape 141 comprises a series of eight leaves 5 143 and a rectangular gluing tongue 144, the leaves and the tongue being mutually joined by mutually parallel fold lines 145 and 145', namely four primary leaves 146, 147, 148 and 149 and four intermediate leaves 150, 151, 152 and 153.

10

The primary leaves 146, 147, 148 and 149 are each joined by second fold lines 154 and 154' to a series of flaps 155, said second fold lines being perpendicular to the first fold lines.

15

One flap in two is substantially rectangular in shape and has its two lateral sides, at least in part, slanting toward the outside of said flap from second fold lines, said second fold lines 154, 154' being substantially 20 aligned or mutually aligned.

The two other flaps are, for their part, rectangular.

More precisely, the primary leaves are constituted by 25 two rectangular leaves, namely a first, small rectangular leaf 147, which is central, and a second, large rectangular leaf 149, situated toward one end, and two primary leaves of substantially rectangular trapezoidal shape, namely a first leaf 146 and a second leaf 148, both 30 symmetrical relative to the small leaf 147 and comprising a slanting side 146' and 148' respectively, directed outward and upward from the small rectangular leaf 147.

The primary leaves are separated by rectangular or 35 substantially rectangular secondary leaves, as indicated above, said secondary leaves being devoid of flaps.

According to the embodiment of the invention which is more particularly described here, the primary leaf 146 comprises a detachable portion 156, extended or not by a recess 157 which allows excess thicknesses to be 5 accommodated when the tray is formed around the upper element of the case, the upper element corresponding to the second shape 142.

The leaf 148 likewise comprises, for its part, a 10 detachable portion 156', but which, in this embodiment, is not necessarily extended by a recess.

The intermediate leaves 150 and 151 are joined to the adjacent primary leaves 146 and 148 by precut fold lines 15 145' and the rectangular flap is joined to the leaf 154 by a precut fold line 154'.

The shape 42 comprises a series of eight rectangular leaves 160, 161, 162, 163, 164, 165, 166 and 167 20 terminated by a rectangular fixing tongue 168.

The leaves are joined one to the other and to the tongue by mutually parallel third fold lines 169, 169'.

25 More precisely, they are constituted by four primary leaves 160, 162, 164, 166, separated in pairs by three secondary leaves 161, 163, 165, the last leaf 166, moreover, being provided with an end leaf 167, disposed at the end of the series of leaves when the flaps are flat 30 and connected with the rectangular tongue 168 on which it is glued when the box is formed.

The tongue 168 is situated on the side of the fold line 171, relative to the leaf 160, its upper edge 171' 35 being in the extension of said fold lines 171.

The tongue 168 extends over a height, for example, arranged so as not to cover over the tongue 144 when the shapes are assembled. This height is, for example, equal to half the height of the leaf 160, the tongue 144 being 5 of a height a little less than this dimension.

In the same way as for the shape 141, the shape 142 comprises, situated on the other side from the series 155, a series of flaps 170 joined to the primary leaves by 10 fourth fold lines 171, 171' perpendicular to the third fold lines 169.

This series of flaps is, for example, identical to the series of flaps 155 described with reference to the shape 15 141.

In the embodiment described here, the detachable wall is constituted by the assembly of leaves 161, 162, 163 for the second shape and the assembly of leaves 150, 147, 151 20 for the first shape.

These two assemblies are fixed together by gluing and are joined to the adjacent primary leaves and to the flap by precut fold lines 145' or 169', and 154' or 171'. 25

Moreover, the fold lines 145 of the first shape are advantageously provided and placed progressively staggered on the side opposite to the leaf 164 relative to the fold lines 169 of the second shape in order to accommodate the 30 excess thicknesses.

The calculations of the staggers are made in a known manner by adapting them to the eight-leaved case model.

35 The portions 156 and 156', as well as the leaf 147, are fixed by gluing ("hot melt", for example) on the

leaves 160 and 164 and 162 of the opposite-facing second shape.

When the case is formed, the tongue 144 is glued on 5 the leaf 153, the tongue 168 on the outside of the leaf 167, and the flaps 55 together.

Figures 20 to 23 show another embodiment of the invention.

10

The first shape 251 (cf. Figure 22) comprises an octagonal central leaf 252, or a rectangular such with cut corners, and two rectangular side leaves 253, fastened to the longitudinal edges of the central leaf by first fold 15 lines 253'.

In this embodiment, the central leaf 252 comprises at some place two transverse flaps 254, each provided with end flaps 255 and 256 joined to the adjacent flaps by 20 mutually parallel sixth fold lines 257, one of which forms the cut corners 258 of the tray (cf. Figure 20).

The second shape 259 (cf. Figure 21) comprises, for its part, four rectangular primary panels 260 and four 25 intermediate panels 261, mutually joined by mutually parallel fifth fold lines 262, and an end tongue 263 for gluing on the opposite-end intermediate leaf.

It further comprises a substantially rectangular set 30 of flaps 264, presenting for two of them, sited opposite each other, side edges running, at least in part, in an outwardly slanting direction in order to end up flush with the cut corners when the case is formed.

35 Two opposite (non-adjacent) primary panels 260 each comprise, on their lower peripheral edge 265, made up of

an open line and centered relative to the panel concerned, a precut, for example rectangular portion 266.

The portions 266 are designed to be glued on the inner 5 face of the walls formed by the side leaves 253, thereby enabling an extraction as shown in Figure 20, the edges 265 being merged or staggered by a thickness of cardboard, or substantially, relative to the first fold line 253', joining the central leaf 252 with the side leaf 253.

10

The vertical fold lines of a central panel assembly 260 and of its two adjacent cut corners 261, of the second shape 259 forming the lid, just like the horizontal fold line 261 of said panel 260 with the upper flap, as well as 15 the corresponding fold lines of the tray 251 between transverse leaf 254, on the one hand, and between small end flaps 255 and 256, on the other hand, are precut according to the invention.

20

The obtained case 267 is advantageously mounted around a mandrel, the second shape 259, previously glued to the first shape as shown in Figure 23, being wound around an eight-sided mandrel, then the first shape being folded down on the bottom of the mandrel with gluing of the end 25 flaps 256, by successive application on the cut corners formed by the intermediate leaves 261, then on the adjacent side leaves 253 (cf. Figure 20).

Figure 24 shows a case 340 according to another 30 embodiment of the invention, provided with a tray 302 of the type previously described.

The upper section 341 is here in one piece, the tear-off face being only a tear-off portion in the bottom 35 portion of the packing.

Figures 25, 26 of the case and Figures 27, 28 of shapes show a case 342 comprising a tray 343 formed by a first shape comprising two side leaves 344, each provided with two rectangular or substantially rectangular precut portions 345 and 346, one 345 of which is situated at one end of the tray and is free on three sides and the other 346 of which is free on two sides, said precut portions being similar to the precut portions 17 or 66.

10 The tray comprises a first set of flaps 347, namely two side flaps (here not represented in the figure) glued to the central side flap 348 and/or a single central side flap 348 (illustrated embodiment).

15 The flap(s) are joined to the corresponding leaves by precut fold lines 349.

20 Similarly, the second shape 350 comprises three rectangular flaps 351 and 352 joined to the corresponding panels by precut fold lines 353.

25 A grip opening 354 is provided at the level of the fold line with the central panel, thereby allowing, when the case is closed and glued, the whole of the front face of the case to be torn off in one piece according to the arrow 355.

30 The tray, for example which can be seized on the other side by the handle 356, will henceforth be able to be removed as previously described, followed by the upper section, which can be grasped by the lower section of flap situated on the other side of the first tear-off set.

35 The horizontal glue lines have been represented in Figures 25 and 26, the flap 348 being glued on the vertical flaps 352, just like the central panel flap 351.

The precut portion 345 is, for its part, provided and glued well ahead of the tray, thereby avoiding gapes in the absence of side flaps which usually hold the tray in the correct position.

5

Figures 29 to 32 show another embodiment according to the invention.

Figure 30 shows a first shape 343 identical to that 10 described with reference to Figure 27.

The second shape 359 (cf. Figure 29) comprises, for its part, four rectangular panels 360, mutually joined by parallel third fold lines 361, 361', and a set of 15 rectangular flaps 362, 363, 364, 365, identical in pairs, one pair (363) of which is designed to end up in the front face of the packing and is joined to the adjacent leaf 360 by a precut fold line 366.

20 Said adjacent leaf is itself joined to its adjacent leaves by precut fold lines 361'.

Here, once again, the front face formed by the panel 360 glued, in the bottom section, on the central leaf flap 25 348, for example by gluing lines 368 (cf. Figure 32), can be completely torn off according to the arrow 369, given the precut fold lines or edges 349, 366 and 361'.

Figure 33 shows another embodiment for the formation 30 of a packing according to the invention, in a plurality of stages A to F, then for shelving (stages G to J), starting off from a first shape 400, intended to form the tray, and a second shape 401, fit to form the lid.

35 The first shape 400 comprises a series of three rectangular leaves 402, 403, 404, of large dimensions (of

the size of the load), mutually joined by first fold lines 405.

The series comprises two sets of rectangular flaps 406 5 and 407 joined at some place to the corresponding leaves, by partially precut connecting lines 408 for the set 406 and by normal fold lines 409 for the set 407.

More precisely, the flaps of the set 406 comprise two 10 side flaps, for example each provided with a precut gluing tab 410 situated toward the central flap and liable to remain glued to a portion 411 facing the central flap.

The connecting line between central flap and 15 corresponding leaf is, for example, in the form of a horseshoe Ω on the fold line, the top of which is situated on the leaf 403 and the side branches of which are in the flap.

20 The set of flaps 407 comprises, for its part, two side flaps 412, each provided at their outer end with two open precut portions 413.

The second shape 401 comprises, for its part, three 25 leaves, namely a first top leaf 414 and two small side leaves 415 of the type described with reference to Figure 27, for example. Each leaf 414, 415 comprises two small rectangular flaps 414', 414'' and 415', 415'', situated at some place, the flaps 414' and 415' being joined to the 30 leaf by precut fold lines.

. The formation of the case will now be described with reference to stages A to F.

35 The blank or shape 400 is laid flat, then, having being coated with glue, is shaped (stage B) by raising of

the side walls 402 and 404 to form the open case 417 (stage C). The side flaps of the sets 406 and 407 have a width equal to half the load 418 in order to form a complete face, the flaps ending up edge to edge.

5

The load 418 (here stacked rectangular boxes 419) is introduced at this point (stage D) into the case, after which the shape 401 is placed over it so as to end up covering the peripheral edges of the vertical walls formed by the leaves 402 and 404, which coincides with the upper edges of the load.

10 The leaf 415 and the flaps 414, 414'', 415', 415'' are then folded down and glued on the upper edge of the case 15 420 thus closed (stage F).

When the case is adapted to shelving, the wall 421 is torn off, which is possible by reason of precut fold lines and/or connecting lines.

20

The lid section formed by the blank 401, and which forms the bottom section on the shelf, is then extracted (stage H), this being made possible by virtue of the separation of the precut portions 416 glued on the walls 25 402 and 404.

Then the upper section 422 is removed on the same side as the tray and the load 418 is thus freed on the rack.

30

In Figures 34 and 35, another casing method according to the invention has been represented, this time using the wrap principle around the load 500.

35

The bottom section or tray 501 is of the type described, for example, with reference to the tray 36 of Figure 4.

This is previously coated with glue, then, for example, formed before or else wound around the load 500.

Similarly, the lid-forming section 502 comprises three 5 large leaves 503, 504, 505, namely a leaf 504 forming the top of the lid, and two rectangular side leaves 503, 505 of a size equal to the height of the load 500.

The leaf 504 is joined to the leaf 503, in a similar 10 manner to the shape 400 described with reference to Figure 33, by a horseshoe-shaped, precut connecting line 506.

The leaf 505 comprises, for its part, a precut portion 15 507 having a coating of glue on the bottom, of the type described on the leaf 42 of Figure 4.

The large leaf 503 comprises, moreover, at some place, two rectangular flaps 508 and 509 of the size of the load and having dimensions of the height of the walls of the 20 tray, the flaps themselves provided with rectangular flaps 510, 511, for example of the width equal to the part of the load, the flaps 510 situated on one side of the leaf 504 being joined by precut fold lines 512.

25 The shape 502 is wound around the load in order, having been glued on the tray by the bottom of the leaves 504 and 505 and, in one embodiment, by precut portions 513 of the tray, to form the case 514.

30 With reference to Figure 35 and in a similar manner to the description given with reference to Figure 34, the wall 515 is torn off, then the tray 516 removed, prior to the lid 517 being taken off in order to free the load completely.

Figure 36 shows in perspective a general view of a machine 1150 according to one embodiment of the invention.

More precisely and likewise with reference to Figure 5 37, the machine 1150 comprises a supporting frame 1151, a first feed unit 1152 for the shapes 1153 intended to form the tray, and a second feed unit 1154 for the shapes 1155 intended to form the upper section of the packing according to the invention.

10

These feed-realization units are known per se and allow the shapes to be apprehended one by one by means of suction cups and then to be tilted on a platform 1156 on which the assembly of shapes according to the invention is 15 formed.

More precisely, with reference to Figure 37, the lower shape 1153 is first of all laid flat following extraction from the feed unit concerned.

20

The precut portions are then coated with glue and the second shape 1155 intended to form the assembly is then taken by the tilting sucker-operated feed system 1154 so as to be precisely positioned, then applied (press 1157) 25 to the first shape 1153, which thus becomes joined together by gluing solely by means of a precut portion.

The assembly of shapes thus formed is then horizontally displaced (cf. Figure 38) by transfer means 30 1158, for example constituted by noria conveyor belts 1159, from beneath a parallelepipedal mandrel 1160, for example to quite a distance from the latter.

During the transfer, the end flaps 1161 and the second 35 precut portion are coated with glue by means 1162 of the "hot melt" vertical injection glue gun type.

PROTOTYPING

Then the central leaf of the first shape (for example) is pressurized on the mandrel, for example by the process and with reference to the device described in patent EP 0 468 860.

5

Similarly, the assembly of shapes is next wound (cf. Figure 39) around the mandrel using a tilting system of arms 1163 and the leaves and/or panels of the shapes are applied under pressure (cf. Figure 40), by a pressure plate 1164, to the mandrel 1160, such that the case is formed in part.

10 Simultaneously, the flaps intended to form a lateral side of the assembly of the formed case are applied to the bottom of the mandrel by pressure cylinders 1165.

15 The case having thus been formed, it is ejected to form a case which can be filled from the side, according to the embodiments which are more particularly described here.

20 With reference, especially, to Figures 37 and 38, the stages of the process according to one embodiment of the invention will now be described.

25

The shapes are placed in the store magazines composed of belt conveyors.

30 The first, bottom, shape 1153 (tray) and the second, body, shape 1154 (upper section) are then removed from the stack.

The second shape 1154 is then positioned between a pusher and movable stops (not represented).

35

The second shape is then transferred onto a bottom stop and is then put in place on the first shape by a connecting rod/crank system (not represented).

5 During this transfer, the connecting zone, that is to say the first precut portion here belonging to the first shape, is coated with glue from above.

10 Next pressurization occurs (press 1157) at the level of the junction and the stops are released.

The assembly of shapes thus joined together is at this point transferred from beneath the mandrel 1160, by virtue of the belts 1159.

15 During this transfer, the assembly of shapes ends up being coated with glue on the flaps and on the second precut connecting portion (glue-spreader 1162).

20 The case is then concretized by elevation of the wrapping arms, the lower plater 1166 is pressurized, the outer connecting panel of the first shape on the second shape is prefolded, then the assembly of longitudinal flaps is folded all at once and, finally, the transverse 25 flaps and the connecting panel are folded and pressurized.

The case is thus concretized with an inverse folding.

Finally, the packing thus formed then proceeds to be 30 ejected, for example by a cylinder situated inside the mandrel.

It is, of course, possible to use other types of magazine, for example arranged for destacking from above 35 or below.

All destacking movements are, indeed, possible (linear by cylinder, or rotary by belts system).

The precision of these types of magazine is therefore ensured by reciprocal-type control systems, that is to say allowing the take-up zone to be adjusted as a function of the set-down position.

This type of magazine, using destacking from above, is also applicable to all types of protective wrapping, including around the product itself ("wrap around" method in Anglo-Saxon terminology).

As is self-evident and as also follows from the above,
15 the present invention is not limited to the embodiments
more particularly described. On the contrary, it embraces
all variants thereof, especially those in which the two
shapes are folded and glued flat one upon the other, or
else in which the shapes of said already glued assembly
20 are made into a tunnel, using certain precut portions.

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